Space Weather Forecast

Issued on Tuesday, 02 May 2023 at 13:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of R1 Minor - R2 Moderate radio blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate over the past 24 hours, with a Moderate-class flare originating from the largest sunspot region in the southwest quadrant, which consists of mature spots and is the most magnetically complex on the disc. Meanwhile, a sunspot region located just east of the north-centre disc is also of note, as a small but compact region, although this has seen a decrease in its magnetic complexity recently. A fairly large sunspot region in the far northeast shows some magnetic complexity and has been responsible for previous Moderate and Common-class flares. A number of new regions are rotating over the eastern limb at present and appear to be ex-sunspot regions from the previous rotation. The remaining sunspot regions on the disc are small and/or simple. There are a number of potentially eruptive filaments (arc of plasma) on the Earth-facing disc, however no new Earth-directed Coronal Mass Ejections (CMEs) were observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind was generally reflective of a waning coronal hole fast wind. Solar wind speeds have varied somewhat erratically between 470-530km/s, but has settled more recently to around 500km/s. The Interplanetary Magnetic Field was weak, with the north-south component also varying weakly. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with a very slight chance of becoming High, mainly on days 1 and 2 (02/03 May).

Solar Wind / Geomagnetic Activity: There are several CMEs which are expected to largely miss Earth in the coming days, however some glancing influences cannot be ruled out. The most likely candidate CME to affect Earth left the Sun on the 29 Apr and is expected to pass by late on day 1 or early day 2 (02 or 03 May). Current fast wind conditions are expected to gradually ease towards background levels, although some peripheral enhancement is also possible from another coronal hole fast-wind on day 1 and 2 (02 and 03 May). The next high-speed stream is likely to be from a coronal hole in the southern hemisphere near centre-disc, although this is just beyond the current forecast period. Geomagnetic activity is expected to be Quiet to Unsettled, but with ongoing chance of Active intervals, mainly late day 1 (02 May) or early day 2 (03 May) and a slight chance of G1 Minor Storm intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to be background with no solar radiation storms occurring. However count rates may increase with any notable flares that occur, mainly from the southwest or northern central sunspots, with a very slight chance to reach the S1 Minor Radiation Storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	15	10	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	40	40
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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